Zero Retries issue 0029 2022-01-21

Advanced Amateur Radio - Data Communications; Space; Microwave… the fun stuff! The Universal Purpose of Ham Radio is to have fun messing around with radios - Bob Witte K0NR. Ultimately, amateur radio must prove that it is useful for society - Dr. Karl Meinzer DJ4ZC. We are confronted by insurmountable opportunities! - Pogo. Nothing great has ever been accomplished without irrational exuberance - Tom Evslin. Irrational exuberance is pretty much the business model of Zero Retries Newsletter - Steve Stroh N8GNJ.

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor

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Request To Send

Countdown to Hamvention 2022 - May 20-22, in Xenia, Ohio - 17 weeks…

It's been yet another busy week - it's amazing the tasks that multiply to consume your waking hours. (Yes, I do understand how laughable that sounds to those still in the paycheck phase of their lives.) This week I have been working on a long article titled "This I Believe - N8GNJ's (and Zero Retries') Vision of Amateur Radio in 2022 and Beyond", but it's far from finished, and time has run short, so that is shunted into the queue for (hopefully) Zero Retries 0030. Ditto the "Preview of Coming Attractions" for Zero Retries in 2022. That's the beauty of being both

the Editor and Writer - things can be published when they're *ready*, not when they're "due". In the meantime, there are plenty of Zero Retries Interesting items to fill this week's issue.

Image courtesy of ARDC

To my surprise and delight I was asked to serve again on the ARDC Grants Advisory Committee for 2022. The reasons aren't germane to discuss here, other than ARDC anticipates receiving *many* grant proposals after a very successful 2021. For 2022, there will be eleven of us on the GAC - five (very welcome) new perspectives. Sadly, in 2022 the GAC lost Renzo Rossi IW0SAB because of increasing work commitments. I really appreciated, and the GAC benefited from IW0SAB's European perspective. One poignant memory of IW0SAB's contributions to the GAC was when we were discussing the MIT Radio Society Radome Renewal grant proposal. That large grant proposal was hard for us on the GAC to understand until IW0SAB matter-of-factly explained (from deep experience) the expensive complexities of a crane plucking heavy things off a 22-story rooftop and getting them *safely* to the ground, and back up again.

Being a member of the ARDC GAC, I'm back in "I can't talk about it until it's public" mode regarding ARDC activities, grant proposals, and awarded grants.

If you want to know more about ARDC's activities in 2021 and what's ahead for 2022, ARDC's first **Community Meeting of 2022** will be held via videoconference on Saturday 2022-01-29 at 10:00 Pacific.

AREDN® Release Notes v3.22.1.0 16 January 2022

Image courtesy of AREDN

AREDN is Amateur Radio Emergency Data Network - a firmware load for various off-the-shelf microwave networking devices such as Wi-Fi and Wireless Internet Service Provider equipment that (among many other features) installs an automatic mesh networking capability and the ability to operate in small portions of spectrum that are exclusive to Amateur Radio, as well as the usual "Part 15" spectrum such as 2.4 GHz and 5 GHz.

Link - The AREDN team is pleased to announce the general availability of the latest stable release of AREDN firmware.
This release includes many significant improvements in the underlying OpenWRT code and stability/scalability fixes to the OLSR mesh routing protocol.

List of Changes:

1. The AREDN simplified firmware filename standard has been changed to the default OpenWRT convention to leverage data files created at build time for future automation of firmware selection.

2. When the size of the hostname and service advertisements exceeded the size of a single network packet, only IP addresses would be known. The advertised services and hostname would not propagate to other nodes on the network. The OLSR routing protocol was changed to fix this.

3. The OLSR scalability failure, commonly called "OLSR storms", has been fixed. Large networks with hundreds of nodes would experience cycles of routing disruption, making the network unusable.

4. SNR history may be missing neighbor node names – fixed.

5. When defining a local location of packages in *Advanced Configuration*, there was no way to change the location of some packages obtained from the upstream Freifunk group. The *Advanced Configuration* page now has a row to define this local location.

6. Performance improvements were made to the *Mesh Status* page based on results from the large scale stress test on Oct 31, 2021.
   Local alerts as configured on the *Advanced Configuration* page can now have zones which allow a mesh user to subscribe to alert messages affecting a specific locale.

7. The allowed number of tunnel connections is now configurable on the *Advanced Configuration* page.

8. There are numerous API updates.

AREDN Development Plan 2022

I was writing an epilogue to the above article saying that the January 2022 update was a "pretty big" update, but not *the* big AREDN update that is expected sometime in 2022. Then this article appeared on the AREDN website making that point, with details.

Following their recent code production release, AREDN has embarked on an ambitious development plan. Here's a basic overview of what is on their plate.

Replace Perl code with Lua

The programming language for the user interface, services and many other functions is written in Perl. The Perl libraries are very large and AREDN has embarked upon a project to replace it with Lua, a much lighter weight programming language designed to run in embedded devices.

In steps, the team will update the “read-only” page to Lua:

- Main
- Mesh Status
- etc.

Then the read-write pages will be updated:

- Basic Setup
- Port Forwarding DHCP and Services
- Tunnel Server
- Tunnel Client
- Administration
- Advanced
- Configuration
- And some others

Resync with OpenWRT
Then the code base will be updated to OpenWRT 21.02.1. Besides code enhancements and security fixes, it brings in:

- Multiple interfaces
- New interface definitions
- API updates (Lua)
- 802.11AC device drivers

Due to the elimination of Perl, enough [memory] space may be freed up to have the tunnel modules installed by default.

A New User Interface (UI)
When that is all done, the UI will be freshened to a more modern and more usable version.

> These are a lot of changes and will require a lot of effort to complete. The team projects these will be completed by the end of 2022.
>
> They will, of course, continue to work on support of newer devices, including AC-devices.
>
> **IMPORTANT NOTE:** While AREDN encourages you to download, install and test the nightly builds and report any issues found, DO NOT install them in any node that doesn't have easy access (e.g., towers, water tanks or mountain tops). By definition nightly builds are not to be considered production grade software.

For those that aren't currently using, or familiar with AREDN systems, I'm confident that you will be hearing a lot more about AREDN by the end of 2022 (not just from Zero Retries). A high-speed microwave data network that automatically forms a mesh network such as AREDN is highly useful capability. What's really nice about AREDN as opposed to Wi-Fi and Wireless ISP equipment is that AREDN is being developed specifically for use in Amateur Radio by Amateur Radio operators. AREDN firmware enables devices to operate in portions of spectrum that are semi-exclusive to Amateur Radio.

In 2022, AREDN software will be even more actively under development. Prior to 2022, a lot of "currently in production" Wi-Fi and Wireless ISP devices that are good candidates for use for AREDN use 802.11ac technology and the necessary drivers to make use of 802.11ac were not available as open source until late 2021. Now that open source drivers are available, AREDN development on 802.11ac devices can proceed.

Because of this more active development phase, and their great track record to date, it's worth mentioning that AREDN is a US 501(c)(3) not-for-profit organization and requests donations:

> … to cover operating expenses such as web site hosting, setup a test and validation lab, obtain associated test equipment, and address the costs of promoting the project through various marketing channels.

Amateur Operation in 3.45 – 3.5 GHz Must Cease by April 14, 2022

From ARRL News 2022-01-18

> The FCC has established April 14, 2022, as the date by which amateur radio transmissions must stop in the upper 3.45 – 3.5 GHz segment of the amateur secondary 9-centimeter band. Secondary operations are permitted to continue indefinitely in the remainder of the band, 3.3 – 3.45 GHz, pending future FCC proceedings.
> On January 14 the FCC released DA 22-39, which announces the results of Auction 110 for the 3.45 – 3.55 GHz band. Release of this notice triggered FCC rules adopted last year requiring that amateur radio operations between 3.45 GHz and 3.5 GHz cease within 90 days of the public notice.
> In October 2021, ARRL President Rick Roderick, K5UR, urged Congress to direct the FCC to preserve Amateur Radio's secondary use of the 3 GHz band in a written statement responding to H.R. 5378, the Spectrum Innovation Act of 2021, before

the US House Commerce Communications and Technology Subcommittee.
A chronology of actions responding to amateur access on the 3.5 GHz band can be found on the ARRL website.

Major ARDC Grant - Building the Digital Library of Amateur Radio & Communications

Image courtesy of Internet Archive

At the risk of making Zero Retries a rehash of ARDC announcements (which I've said I was going to mostly leave to ARDC's public relations), this ARDC grant to Internet Archive is worth some additional discussion here in Zero Retries. First, here is ARDC's announcement of the grant:

> Date: December 2021
> Amount: $889,405
> With this grant, the Internet Archive will build the **Digital Library of Amateur Radio & Communications (DLARC)**: an online, open-access resource that preserves the vital resources — past, present, and future — that document the history of amateur radio and communications. The DLARC will provide a key open-access educational resource, free to use for researchers, students, and the general public. It will also serve as a permanent archive for the preservation of the history of ARDC, its members, and key individuals and organizations involved in the broader amateur radio movement. The DLARC will be both an education program building a unique and unparalleled collection of primary and secondary resources, but also an innovative technical project that will build a digital library that combines both digitized print materials and born-digital content and whose curatorial focus is driven by archiving and providing unified access to both personal and organizational archival records. Building the DLARC thus includes three distinct areas of work:
>
> • a large-scale scanning program that digitizes relevant print materials such as journals, monographs, books, physical ephemera, and other physical records from

both institutions and individuals;
• a large-scale digital archiving initiative that seeks to curate, archive, and provide specialized access to "born-digital" materials, such as digital photos and audio-video, as well as websites and web-published material;
• a personal archiving campaign to ensure the preservation and future access of notable individuals and stakeholders involved in the founding and activities of ARDC and the broader community.

Disclaimer: I was on the 2021 ARDC Grants Advisory Committee when this grant proposal was evaluated. The following information is from what's been publicly disclosed, and some personal extrapolation from that information.

DLARC (that's going to take a while to internalize) might sound mundane, but it's a profound change in Amateur Radio. Finally Amateur Radio's history isn't going to be left to the best efforts of individuals and organizations, both of which have the unfortunate tendency to die off. Think of all the (paper) newsletters from defunct Amateur Radio clubs languishing in the archives of individual Amateur Radio Operators that are often thrown in the recycle bin after becoming a Silent Key. Think of all the Amateur Radio books that are now out of print and have no (commercial) possibility (or interest) in being re-released as ebooks. Internet Archive is all about *digital* preservation - not just shelving books and magazines onto a warehouse shelf (or box)… though they *do* do that. (Reportedly, think multiples of the artifacts warehouses in the Indiana Jones movies.) Not only does Internet Archive digitize magazines and books, but software, video recordings, audio recordings, etc. so that they can be accessed via the most widespread method humanity has ever devised - the Internet, the web, and whatever follows. Best of all, not only is such material digitized, but it's *digitized and indexed* (as in searchable; such as image PDFs of magazines become text searchable).

The most profound change that DLARC will bring about for Amateur Radio is that Internet Archive was *born* as, and will forever be "public access"… as in ***no paywalls***. Internet Archive does not do anything that *isn't* public access. Everything that DLARC ingests will eventually become publicly accessible. If a copyright holder (such as certain publications of the previous century's Amateur Radio Publishing Industrial Complex) objects to Internet Archive making copyrighted material publicly accessible, then Internet Archive removes such material from public access. But, *that material is still preserved*… until such time as the copyright eventually expires and it *can* then be made publicly accessible.

Yes, the Internet Archive has been doing this for 25years now, and there are already notable Amateur Radio projects in the Internet Archive such as the complete run of 73 Magazine, but ARDC's grant provides special status to Amateur Radio within Internet Archive by providing *dedicated staff and resources* to perform the acquisition, digitization, and presentation. From experience, trying to find specific material, especially for easy browsing (try browsing Byte Magazine in sequence of publication to see what I mean) can be a treasure hunt. That's partly by design and partly by benign neglect; Internet Archive is ingesting and archiving *so* much material that the "organizing" is sometimes left as an "eventually" task because the ingesting and archiving is time sensitive; magazines are crumbling into dust (cheap paper) and floppy disks are getting very difficult to read.

Note that this announcement came from ARDC as an announcement of the grant award. There's no corresponding announcement from Internet Archive announcing that DLARC is up

and running. The grant was awarded in December; it will take time to get DLARC ready. So, get your donations for DLARC ready, but don't send them yet. Wait for the announcement from Internet Archive. That's what I'll be doing; I can't wait for my packet radio archives to go to their new home at DLARC.

ZR > BEACON

- **UALR Callsign Server Offline** My favorite web-based callsign lookup, operated by University of Arkansas at Little Rock (UALR) - http://callsign.ualr.edu/callsign.php went offline in December. I really love UALRCS because *every* other web callsign lookup spams you with ads or other crap; UALR's doesn't - it's just a public service, and thus I really miss it. I was able to contact UALR CS' administrator. The server's current home (hosting) was shut down, but there is potential (hope) for it to come back online from another hosting situation at UALR (or elsewhere).

- **Nationwide Amateur Radio Packet Directory**
  From Brian Webster N2KGC - *One of our EastNet members Chris Lance WW2BSA has been maintaining a database and map of all the packet [infrastructure] stations he can find information on. It's kind of like a repeater directory for packet stations. It has seen press in QST and On-The-Air in recent months.*
  http://hackettstownarts.org/ww2bsapacketmap.htm
  N2KGC is a colleague from my days of writing about Wireless Internet Service Providers and it was great to get back in touch with him.

- **ENZEC is now free (as in beer)** - Want to learn antenna modeling? EZNEC is now free!
  This is *the* Amateur Radio antenna modeling software. Thanks for Dan Romanchik KB6NU for this pointer.

- **Automatic Packet Reporting System (APRS) using a Software Defined Transceiver (SDT)** - An APRS Tracker with HACKRF, WEBUSB AND WASM. I really love approachable and practical articles like this about using Software Defined receivers and transceivers. Thanks to RTL-SDR.com for this pointer.

- **Apartment stealth antenna** - Efficient 2 meter Disguise Antenna Made From a TV Satellite Dish by John Portune W6NBC. I remember this project from QST Magazine (2016-03) and recently found it online. KK7BKI and I might try this. W6NBC offers many antenna projects online, and kudos to him for making his material publicly accessible instead of leaving it to languish behind ARRL's paywall.

- **Two new products from Masters Communications** are now available to upgrade your Tigertronics SignaLink USB audio interface.
  DRA-SR-RJ45 *with RJ45 radio connector. Reuse your existing SignaLink USB radio cables and "plug-n-play" jumper modules!*
  DRA-SR-DIN6 *with Mini-DIN-6 radio connector. Great for radios with a dedicated Mini-DIN-6 data port!*
  Kevin Custer W3KKC continues to amaze with his ability to rapidly create new variations of USB audio interfaces for higher speed data communications in Amateur

Radio! I'll guess that these were designed for those that like the ability to adjust "knobs" on their SignaLink USB units, but wanted the ability to run the highest speed possible on VARA FM (VARA FM "Wide" - Level 13) which older SignaLink USB units cannot do.

Feedback Loop - Zero Retries 0028

- **ReadyKillowatt:** *RE: Bridgecom 220 MHz "module." Do they publish a part number? If they're the only company using this critical module it might make some sense for them to produce a reference design or opening up their schematics for others to produce and/or improve. One of the reasons why the packet TNC was successful was because the TAPR design was fairly open to any manufacturer.*
  Your question would be a conversation to have with Bridgecom. As I stated in my original article, I tried to engage Bridgecom Systems to discuss on the record their 222 MHz products, but they ignored my request. Bridgecom Systems doesn't seem receptive to open source principles like what you're suggesting.

- **Charles Hargrove N2NOV:** *RE: Brian Rogers N1URO - Silent Keyboard. As a follow-up to the N1URO entry, I have taken on the task as 44Net coordinator for his states (ME, NH, VT, MA, RI, CT, NJ, PA, MD & DE) in addition to my own of NY that I have been running since 2014. I have set up separate mailing lists for anyone running 44Net and/or packet operations in those eleven states.*
  Thanks for stepping up to this unglamorous task N2NOV! The 44net coordinators are unsung heroes. The past and current 44net coordinators for Western Washington are friends of mine, and it can be a demanding time sink at times.

Contributors This Issue

- Orv Beach W6BI doesn't publicly take credit for much of what he does on behalf of AREDN (this issue's two articles on AREDN), but I'm grateful that he pays attention to Zero Retries and is happy to provide source material upon request.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, here are some pointers:

- **Ham Radio for Dummies** by Ward Silver N0AX is a great overview of Amateur Radio. N0AX is a gifted writer and HRFD is now in its 4th edition.

- My two favorite **YouTube** channels for a good overview of Amateur Radio are AmateurLogic.TV. and Ham Nation (part of Ham Radio Crash Course). These folks just seem to have so much fun!

- Dan Romanchik KB6NU offers a free **No-Nonsense Study Guide** for the Technician test (PDF).

- HamExam.org Amateur Radio Practice Exams offers good **Flash Card and Practice Exams**.

- When you're ready to take an **Amateur Radio examination** (Tech, General, or Extra), W1MX - The MIT Amateur Radio Society offers remote exams, free for students and youngsters. *There are apparently many other remote exam options*.

Bonus - with an Amateur Radio license, you'll be more attractive on dates 😀

Closing the Channel

- My ongoing Thanks to Tina Stroh KD7WSF for, well, *everything*, Bill Vodall W7NWP as *Zero Retries Instigator in Chief*, and Larry Gadallah NM7A for his long term encouragement about Zero Retries.

- My ongoing Thanks to pseudostaffers Dan Romanchik KB6NU, Jeff Davis KE9V, and Steve Lampereur KB9MWR for continuing to spot, and write about "Zero Retries Interesting" type items, on their respective blogs, from Amateur Radio and beyond, that I don't spot on my own.

- For those that get the reference, Southgate Amateur Radio News is, to me, the "Slashdot" of Amateur Radio. It consistently surfaces "Zero Retries Interesting" stories.

- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

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much feedback) getting some satisfaction that the data shows that people actually do read Zero Retries.

All previous issues of Zero Retries are available without restriction (no paywalls). For some background, Zero Retries 0000 was the **Introduction Issue**. Zero Retries 0026 and Zero Retries 0027 were a **2021 Year End Review** of Zero Retries.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*

- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ
These bits were handcrafted in beautiful Bellingham, Washington, USA
2022-01-21

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